1 **SAFETY AND PROTECTION OF SYSTEMS AND DEVICES**
2 .Arc suppression at switching point (i.e., includes solid-state switch)
3 ..Synchronized or sequential opening or closing
4 ...Counter electromotive force
5 ...With current sensitive control circuit
6 ...With voltage sensitive control circuit
7 ...With combined voltage and current sensitive control circuit
8 ...Shunt bypass
9 ....With sequentially inserted impedance
10 ..By inserting series impedance
11 ...Nonlinear impedance
12 ...By arc stretching (e.g., horn gap)
13 ..Shunt bypass of main switch
14 ..Arc blowout for main breaker contact (e.g., electromagnet, gas, fluid, etc.)
15 .Capacitor protection
16 ..Series connected capacitors
17 ..Shunt connected capacitors
18 .Voltage regulator protective circuits
19 .Superconductor protective circuits
20 .Generator protective circuits
21 ..Voltage responsive
22 .Compressor protective circuits
23 .Motor protective condition responsive circuits
24 ..Current and temperature
25 ..Motor temperature
26 ...With bimetallic sensor
27 ...With thermistor sensor
28 ..With time delay
29 ...During energization of motor
30 ..Current and voltage
31 ..Current
32 ...Bimetallic element
33 ..Voltage
34 ...Bimetallic element
35 .Transformer protection
36 ..With differential sensing means
37 ..With temperature or pressure sensing means
38 ..Transformer with structurally combined protective device
39 ...With lightning arrester and fuse
40 ...With lightning arrester (e.g., spark gap)
41 ...With fuse
42 .Ground fault protection
43 ..Fault suppression (e.g., Petersen coil)
44 ..With differential sensing in a polyphase system
45 ..With differential sensing in a single phase system
46 ...With more than two wires
47 ..In a polyphase system
48 ...With more than three wires
49 ..In a single phase system
50 ...With more than two wires
51 .Overspeed responsive
52 .By regulating source or load (e.g., generator field killed)
53 ..Prime mover control
54 .Load shunting by fault responsive means (e.g., crowbar circuit)
55 ..Disconnect after shunting
56 ..Voltage responsive
57 ..Current responsive
58 .Impedance insertion
59 .Circuit automatically reconnected only after the fault is cleared
60 ..With differential voltage comparison across the circuit interrupting means
61 ..Reclosing of the nonfaulty phases of a polyphase system
62 .Feeder protection in distribution networks
63 ..With current responsive fault sensor
64 ...With communication between feeder disconnect points
65 ..With current and voltage responsive fault sensors
66 ...With communication between feeder disconnect points
67 .Series connected sections with faulty section disconnect
68 ..With communication between disconnect points
69 ...Pilot wire communication

70 ..Constant current system
71 .Automatic reclosing
72 ..With lockout means
73 ...Including timer reset before lockout
74 ..Continuous
75 ...With time delay before reclosing
76 .With phase sequence network analyzer
77 .Reverse phase responsive
78 .With specific quantity comparison means
79 ..Voltage and current
80 ...Distance relaying
81 ....With communication means between disconnect points
82 ...Reverse energy responsive (e.g., directional)
83 ...With time delay protective means
84 ..Reverse energy responsive (e.g., directional)
85 ..Phase
86 ..Voltage
87 ..Current
88 .With specific voltage responsive fault sensor
89 ..With time delay protective means
90 ..Overvoltage and undervoltage
91.1 ..Overvoltage
91.2 ...With resistor sensor
91.3 ...Including time delay
91.4 ...Including photo-coupling (e.g., photo-receptors, photo-emitters, etc.)
91.5 ...Including P-N junction (e.g., a diode, a zener diode, or transistor)
91.6 ....With zener diode sensor
91.7 ...Protection by snubber circuitry
91.8 ...Protection for thyristor
92 ..Undervoltage
93.1 .With specific current responsive fault sensor
93.2 ..Digital control
93.3 ..Rating plug
93.4 ..Automatic reset after trip
93.5 ..Transformer and resistor sensors
93.6 ..Transformer sensor (i.e., toroidal current sensor)
93.7 ..Resistor sensor
93.8 ..Thermal sensing
93.9 ..Current limiting
94 ..With time delay protective means
95 ...With instantaneous override
96 ....With multiple timing characteristics (e.g., short, long)
97 ...With multiple timing characteristics
98 ...Transistorized
99 ...Combined thermal-electromagnetic relay
100 ..With semiconductor circuit interrupter (e.g., SCR, Triac, Tunnel Diode, etc.)
101 ...With transistor circuit interrupter
102 ..With mechanical circuit breaker
103 .Circuit interruption by thermal sensing
104 ..With fuse
105 ..With bimetallic element
106 ..With thermistor
107 .With specific transmission line (e.g., guarded)
108 ..Plural conductors in single sheath (e.g., compound)
109 .Too large fault makes breaker inoperative
110 .Transient nonresponsive (e.g., ignores surge on transmission line)
111 .Transient responsive
112 .With space discharge means
113 .With tuned circuit
114 .With manual or automatic opening of breaker and manual reclose
115 .With specific circuit breaker or control structure
116 ..Pneumatically operated circuit breaker
117 .High voltage dissipation (e.g., lightning arrester)
118 ..Surge prevention (e.g., choke coil)
119 ...In communication systems
120 ..Vacuum or gas filled space discharge

121 ..Fluid (e.g., mercury, quenching)
122 ...Electrolytic
123 ...Gas blast
124 ..Thermal (e.g., fusible, bimetallic)
125 ...With cutout (e.g., blowout type)
126 ..Current limiting material in discharge path
127 ...Nonlinear material (e.g., valve type)
128 ....With plural gaps in discharge path
129 ..Plural gaps with common electrode
130 ..Plural gaps serially connected
131 ..Combined (e.g., with disconnect switch)
132 ...With line supporting insulator
133 ..With magnetic means (e.g., electromagnet)
134 ...Arc stretching (e.g., blowout)
135 ....By separating contacts
136 ...For grounding line
137 ..Horn gap
138 ...With resistance insertion
139 **CONTROL CIRCUITS FOR ELECTROMAGNETIC DEVICES**
140 .Including compensation for thermal change of electromagnetic device
141 .Including superconductivity
142 .Including housing
143 .Systems for magnetizing, demagnetizing, or controlling the magnetic field
144 ..For lifting or holding
145 ...Magnetic chuck-type
146 ..Systems for magnetic field stabilization or compensation
147 ..With permanent magnet
148 ...Calibration or permanent magnet
149 ..Demagnetizing
150 ...Television degaussing
151 ...Magnetic tape
152 ..Including particular drive circuit
153 ...Pulse initiated
154 ...Including means to establish plural distinct current levels (e.g., high, low)
155 ....With capacitor charging or discharging through coil
156 ...With capacitor charging or discharging through coil
157 .Including instrument (e.g., meter-relay)
158 ..Temperature indicating instrument
159 .Including means for using, or compensating for, the induced EMF of the electromagnetic device
160 .For relays or solenoids
161 ..Including thermal device
162 ...Thermoelectric
163 ...Bimetallic element
164 ....Including heater
165 ...Thermistor
166 ..Plural relays or solenoids sequentially operated
167 ...Alternately operated
168.1 ...Pulse responsive
169.1 ....Including electronic element
170 ..Condition responsive (e.g., external circuit condition)
171 ...Code responsive
172 ....Including electronic element
173 ...Light
174 ....Light sensor controls its light path
175 ....Including electronic element
176 .....Plural light sensors
177 ....Plural light sensors
178 ...Fluid (e.g., liquid level, humidity)
179 ...Proximity or contact
180 ....Metal presence or absence responsive
181 ....Capacitance change-type
182 ...Frequency (e.g., audio, radio)
183 ....Plural relays or solenoids as loads
184 ....Specific frequency responsive relay
185 ...Phase
186 ...Pulse
187 ...Voltage or current level discriminators
188 ...Variable impedance
189 ..Plural switches in control circuit
190 ...Including electronic switch
191 ..Plural relay or solenoid load selectively operated
192 ...Including interlock
193 ....Electronic interlock

194 ..Holding means
195 ..Time delay
196 ...Including semiconductor device connected to timing element
197 ....Threshold device (e.g., zener, schockley diode)
198 .....Including three or more electrodes (e.g., unijunction)
199 ...Including electric discharge device
200 ....Threshold device (neon tube)
201 .....Including thyratron
202 ...Electromechanical delay means
203 ..With oscillator
204 ..With magnetic amplifier or saturable reactor
205 ..Threshold device (e.g., SCR, thyratron)
206 ..Particular relay or solenoid
207 ...Electrostatic
208 ...Polarized
209 ...Alternating current type
210 ...Plural coils
211 **CONTROL CIRCUITS FOR NONELECTROMAGNETIC TYPE RELAY (E.G., THERMAL RELAYS)**
212 **DISCHARGING OR PREVENTING ACCUMULATION OF ELECTRIC CHARGE (E.G., STATIC ELECTRICITY)**
213 .By charged gas irradiation
214 .Of paper or paper handling machine
215 .Of storage or hazardous area or fluid handling
216 .Structurally combined with building or vehicle
217 ..With external structure of vehicle
218 ...Aircraft
219 ...Chain-type grounding means
220 .Specific conduction means or dissipator
221 ..Brush- or roller-type structure
222 ..Rod-type structure
223 ..Shoe type
224 ...Integral with shoe
225 **ELECTRIC CHARGING OF OBJECTS OR MATERIALS**
226 .Particulate matter (e.g., liquids with suspended particles)
227 ..For spray production
228 ...Liquid type
229 .By charged gas irradiation
230 **ELECTRIC CHARGE GENERATING OR CONDUCTING MEANS (E.G., CHARGING OF GASES)**
231 .Modification of environmental electric charge
232 .For application to living beings
233 .Use of forces of electric charge or field
234 ..Pinning
235 .With specific power supply
236 **ELECTRICAL SPEED SIGNAL PROCESSING SYSTEMS**
237 .With centrifugal weight means
238 .Antislip detection and circuitry
239 .With speed analog electrical signal
240 .Including frequency generators
241 .Two position (e.g., on-off)
242 .With speed comparison
243 .Synchronization of shafts
244 ..Phase comparison
245 **POLARITY REVERSING**
246 .Automatic
247 **IGNITING SYSTEMS**
248 .For explosive devices
249 ..With sequential firing by electronic switching
250 ..With sequential firing by mechanical switching
251 ..With capacitor discharging into explosive device
252 ..With electromechanical power source
253 .For electric spark ignition
254 ..With electromagnet control means
255 ...Including spark electrode make-break
256 ..With capacitor discharging into sparking transformer
257 ..With capacitor discharge into spark gap
258 ..With electromechanical generator
259 ...With permanent magnet
260 ...With piezoelectric element
261 ..With mechanical arrangement for spark electrode make-break
262 ..With one spark electrode which is hand held
263 ..With spark coil or transformer
264 .For incandescent ignition
265 ..With electromagnet control means

266 ..With helical heating element
267 **DEMAGNETIZING SYSTEMS AND PROCESSES**
268 **TRANSFORMERS AND INDUCTORS WITH INTEGRAL SWITCH, CAPACITOR, OR LOCK (E.G., IGNITION COIL)**
269 .With lock for preventing unauthorized use
270 .With capacitor element
271 **ELECTROSTATIC CAPACITORS**
272 .With protection or compensating means
273 ..Self-healing
274.1 ..Temperature
274.2 ...With fluid cooling means
274.3 ...With heat sink
275.1 ..For electrical irregularities
275.2 ...With over-pressure breakaway fuse
275.3 ...With resistance element
275.4 ...With thermal fuse
276 .Cryogenic
277 .Variable
278 ..With significant electrode or terminal feature
279 ..Gas or vacuum dielectric
280 ..Responsive to external condition
281 ...Electrical
282 ...Thermal
283.1 ...Pressure
283.2 ....By displacement of stylus or lever
283.3 ....By differential capacitor
283.4 ....By diaphragm
284 ...Liquid level
285 ...Fluid flow
286 ...Humidity
287 ..Mechanically variable
288 ...Push button
289 ...Motor driven
290 ...By varying distance between electrodes
291 ....Compression type
292 ...By varying effective area of electrode
293 ....Disk trimmer
294 ....Direct travel piston type
295 ....Piston trimmer
296 ....Sliding plates
297 ....Spiral or helical plates
298.1 ....Rotary plates
299.1 .....Plural capacitors
299.2 ......Details of electrical connecting means (e.g., terminal or lead)
299.3 ......Details of mounting means
299.4 ......With adjustment means
299.5 ......Details of insulator feature
298.2 .....Details of plate feature
298.3 .....Details of dielectric
298.4 .....Details of electrical connecting means (e.g., terminal or lead)
298.5 .....With adjustment means
300 ...With controlling or indicating means
301.1 .Fixed capacitor
301.2 ..Special type (e.g., "bypass" type)
301.3 ..Encapsulated
301.4 ..Stack
301.5 ..Wound
302 ..Feed through
303 ..Significant electrode feature
304 ...Non-self-supporting electrodes
305 ...Material
306.1 ..Details of electrical connection means (e.g., terminal or lead)
306.2 ...For decoupling type capacitor
306.3 ...For multilayer capacitor
307 ...Lead extends into body of capacitor
308.1 ...Lead attached to edge of capacitor
308.2 ....Cap
308.3 ....Wire
309 ....Metallized terminal
310 ...Lead extends around at least a portion of capacitor
311 ..Solid dielectric
312 ...Plural dielectrics
313 ....Layered
314 ....Impregnated
315 .....With specific impregnant
316 ......Including wax
317 ......Including halogen (e.g., chlorinated)
318 ....With stabilizer or modifying substance
319 .....With stabilizer or modifying substance
320 ....Ceramic and glass
321.1 ...Ceramic, glass, or oxide particles

321.2 ....With multilayer ceramic capacitor
321.3 .....Including metallization coating
321.4 .....Composition
321.5 ....Composition
321.6 ....With tubular capacitor
322 ....Oxide film
323 ...Plastic
324 ...Fibrous or fabric (e.g., paper, etc.)
325 ...Mica
326 ..Vacuum or gas dielectric
327 ..Liquid dielectric
328 ..Multiple capacitors
329 ...Distinct physically
330 ...Shared electrode
600 **HOUSING OR MOUNTING ASSEMBLIES WITH DIVERSE ELECTRICAL COMPONENTS**
601 .For electrical power distribution systems and devices
602 ..Distribution station (i.e., substation)
603 ...Having transformer
604 ...Gas insulated
605 ..Electrical switchgear
606 ...Truck type
607 ....With interlock
608 ...Drawer type
609 ....With interlock
610 ...Pivoted support means
611 ...Busbar arrangements
612 ....Gas insulated
613 ....Liquid insulated
614 ....With plural removable control units in housing
615 ...With interlock
616 ....Door or cover type
617 ....Shutter type
618 ...Gas insulated
619 ...Having gas circuit breaker
620 ...Having transformer
621 ...Having isolating switch
622 ..Distribution or control unit
623 ...Having transformer
624 ...Having busbar arrangement
625 ...Portable
626 ...Having fuse or relay
627 ..Distribution or control panel board
628 ...With switches and fuses
629 ....Unit block
630 ...With fuses
631 ...With switches
632 ....With switch actuating arrangements
633 ...Plugboards
634 ...With circuit breaker arrangements
635 ....With discriminating means
636 ....Plug-in or removable
637 ...Busbar or conductor arrangements
638 ....U-shaped member
639 ....With horizontal busbar
640 ....With removable or plug-in connection
641 ..Electrical service distribution box
642 ...With fuse
643 ...With switch
644 ...Including panel board
645 ....Adjustable panel
646 ....With fuse support means
647 ....With switch support means
648 ....Busbar arrangements
649 .....U-shaped member
650 .....Spaced parallel relationship
651 ....Panel board corner mountings
652 ....Circuit breaker supporting arrangements
653 .....With discriminating means
654 .....With tamper prevention means
655 .....Having two row arrangement
656 .....With plug-in circuit breakers
657 ...With removable member
658 ...With plastic enclosure or support
659 ..For electricity service meter
660 ...Plural
661 ...With meter circuit controller
662 ....Bypass arrangement
663 ....With transformer or circuit breaker
664 ...Meter mounting arrangements
665 ....Adaptable meter supports
666 ....Retractable or detachable meter support
667 ....Removable cover
668 ...Meter terminal and connector arrangements
669 ....Terminal block
670 ....Contact blade receiving structure

671 ....Adjustable or adaptable contacts
672 ...Tamper resistant
673 ..Circuit breaker supporting means (i.e., attaching, mounting, etc.)
674 ..For ballast elements
675 ..Bus duct
676 ..With cooling means
677 ...Fluid
678 ....Air
679 .For electronic systems and devices
680 ..Including keyboard support
681 ..Including display support
682 ...CRT support
683 ..Computer related support
684 ...Memory unit support
685 ....Disk drive support
686 ...Input/output device support
687 ...With cooling means
688 ..With cooling means
689 ...Fluid
690 ....Air
691 .....Pressurized or conditioned
692 .....Plural Openings
693 ......Circular
694 .....With air circulating means
695 ......Fan or blower
696 ....With heat exchanger unit
697 ....With heat sink or cooling fins
698 .....And liquid
699 ....Liquid
700 .....Change of physical state
701 ....With heat exchanger unit
702 ....With cold plate or heat sink
703 ....With cooling fins
704 ...Thermal conduction
705 ....By specific coating
706 .....Containing silicon or aluminum
707 ....Through support means
708 .....Specific chemical compound or element
709 .....Heat sink
710 ......Details
711 ......Cooling plate or bar
712 .....Thermally and electrically conductive
713 .....Electrically insulating thermally conductive
714 ....Through component housing
715 ....For module
716 .....Plural
717 ....For active solid state devices
718 .....For integrated circuit
719 ......Circuit board mounted
720 ....For printed circuit board
721 .....Plural
722 ....For electronic circuit
723 ....For lead frame
724 ..Cabinet-type housing
725 ...With retractable or readily detachable chassis
726 ....With locking means or device
727 ....Sliding component or commpartment
728 ..Module
729 ...Plural
730 ....With housing
731 .....Interchangeable
732 .....Having lock or interlock
733 .....Selective connections
734 ....With coupling or decoupling capacitor
735 ....Stacked
736 ...With printed circuit boards
737 ....IC card or card member
738 ....With resistor and capacitor
739 ....With particular material
740 ....With locking means or device
741 ....Guiding means
742 ....With spacer
743 ....Solder connection
744 ....Cordwood type
745 .....Welded connection
746 ...With specific dielectric material or layer
747 ...With locking means or device
748 ..Printed circuit board
749 ...Flexible board
750 ....With specific dielectric material or layer
751 ....With particular conductive material or coating
752 ...With housing or chassis
753 ....Specific chassis or ground
754 ....With ejector means
755 ....Rotatable
756 ....Guiding means
757 ....With particular material
758 ....With spacer
759 ....With lock or interlock
760 ...Connection of components to board

761 ....Component within printed circuit board
762 .....With specific dielectric material or layer
763 .....Capacitor and electrical component
764 .....Integrated circuit
765 ....By direct coating of components on board
766 .....Capacitor and resistor
767 ....With mounting pad
768 .....Having leadless component
769 .....Having spring member
770 .....Having spacer
771 .....Having particular material
772 ....With specific lead configuration
773 .....Shaped lead on components
774 .....Shaped lead on board
775 .....Busbar
776 .....Flexible connecting lead
777 ....By specific pattern on board
778 .....Cross-connected
779 .....With specific connection material
780 ....Different voltage layers
781 ....With switch
782 ....Having passive component
783 ....Having semiconductive device
784 ...Plural
785 ....With separable connector or socket means
786 .....Having key connection
787 .....Having spring member
788 .....Having backplane connection
789 .....Having flexible connector
790 .....Stacked
791 .....Multiple contact pins
792 ....Plural contiguous boards
793 .....Thick film component or material
794 .....Power, voltage, or current layer
795 .....Plural dielectric layers
796 ....With housing or chassis
797 .....Storage or file cabinet
798 .....With ejector or extractor
799 .....Grounding Construction or Detail
800 .....With Shielding Structure
801 .....Specific latching or retaining device
802 .....Specific alignment or guide means
803 ....Interconnection details
804 ....Spacer details
805 ..Matrix assembly
806 ...Diode
807 ..Component mounting or support means
808 ...Mounting pad
809 ...With discrete structure or support
810 ...Plural mounting or support
811 ...With passive components
812 ...With particular insulation
813 ..Lead frame
814 ..Radio type
815 ...Tube mounting
816 ..Shielding
817 ...For electronic tube
818 ...EMI
819 ..For relay
820 ..For semiconductor device
821 ..For capacitor and inductor
822 .Contact banks
823 .Terminal block
824 ..With protective device or unit
825 .Support brackets
826 .Wire distribution (e.g., harness, rack, etc.)
827 ..With interconnecting cable
828 ..With switchboard or switch
829 .Frame
830 ..With plurality of capacitors
831 ..With cooling means
832 ..With switchboard or switch
833 .Fuse block
834 ..Plural
835 .Fuse pullout device
836 .For transformer
837 .For switch or fuse

500 **ELECTROLYTIC SYSTEMS OR DEVICES**
501 .Coulometer (i.e., electrochemical timer)
502 .Double layer electrolytic capacitor
503 .Liquid electrolytic capacitor
504 ..With significant electrolyte
505 ...Salt solute
506 ...Ethylene glycol
507 ...With depolarizer
508 ..Anode type electrode
509 ...Aluminum or tantalum
510 ...Anode riser
511 ...Wound
512 ....With separator

513 ....With mounting means (e.g., anchoring means or clamping)
514 ....With heat conductor (e.g., heat sink)
515 ....With common conductor (e.g., stripline)
516 ..Cathode type electrode (e.g., cathode casing)
517 ..Casing
518 ...With hermetic seal
519 ...With header, cover, or endseal
520 ....Significant electrical connection means (e.g., terminals or leads)
521 ...With vent means
522 ..Multiple capacitors
523 .Solid electrolytic capacitor (e.g., dry electrolytic capacitor)
524 ..Dielectric
525 ..With significant electrolyte or semiconductor
526 ...Paste or gel
527 ...Organic salt (e.g., TCNQ)
528 ..Anode type electrode
529 ...Aluminum or tantalum
530 ...Wound
531 ....With lead conductor
532 ..Cathode type electrode
533 ...With significant lead
534 ..With protection means
535 ..Casing
536 ...With hermetic seal
537 ...With header, cover, or endseal
538 ....Significant electrical connection means (e.g., terminals or leads)
539 ....With potting
540 ..With terminal
541 ..Multiple capacitors
434 .Systems (e.g., plural cells, standby exciting voltage)
435 .Current interruption type (e.g., circuit breaker, D.C.-to-pulse converters)
436 .Rectifiers
437 **MISCELLANEOUS**

FOREIGN ART COLLECTIONS

FOR 000 **CLASS-RELATED FOREIGN DOCUMENTS**

Any foreign patents or non-patent literature from subclasses that have been reclassified have been transferred directly to FOR Collection listed below. These collections contain ONLY foreign patents or nonpatent literature. The parenthetical references in the Collection titles refer to the abolished subclasses from which these Collections were derived.

SAFETY AND PROTECTION OF SYSTEMS AND DEVICES (361/1)
.With specific voltage responsive fault sensor (361/88)
FOR 100 ..Overvoltage (361/91)
SAFETY AND PROTECTION OF SYSTEMS AND DEVICES (361/1)
FOR 101 .With specific current responsive fault sensor (361/93)